



Agency for Toxic Substances and Disease Registry
Region 3
1650 Arch Street, 3HS00
Philadelphia, PA 19103

June 24, 2013

Mr. Todd Richardson
On Scene Coordinator
Hazardous Site Cleanup Division
U.S. Environmental Protection Agency, Region 3
1650 Arch Street (MS: 3HS31)
Philadelphia, PA 19103

Dear Mr. Richardson,

This letter is in response to your June 4, 2013, request that the Agency for Toxic Substances and Disease Registry (ATSDR) evaluate—from a public health perspective—the need for further environmental characterization at the Kaercher Creek State Park site in Windsor Township, Berks County, PA.

The Kaercher Creek State Park site is one of several sites in the general Hamburg, Berks County area that have been impacted by waste disposal from area battery manufacturing and recycling facilities. Historical use of lead-acid battery casings and fragments as fill material resulted in significant lead contamination throughout the area. Sites with this fill material in this locale have had concentrations as high as 300,000 parts per million (ppm) in soil.

The Kaercher Creek State Park is owned by the Pennsylvania Fish and Boat Commission (PFBC), and is reportedly leased to the Berks County Parks and Recreation Department. As a result of the historical lead contamination at this site, PFBC conducted cleanup actions at the park in 1997. Actions included construction of a cap on a portion of the park. In September 2012, a local resident reported to the Pennsylvania Department of Health (PADOH) that there were areas that contained exposed battery fragments in the surface soils in the park along walking trails and in partially wooded areas near the boat ramp/parking lot. PADOH contacted EPA with this information. On a September 2012 site visit, EPA confirmed the presence of battery fragments in surface soils of a partially wooded park area and along a walking trail. EPA randomly selected 10 to 15 locations for lead screening using XRF and reported lead concentrations in surface soils up to 3,500 ppm. Adults and children have been observed fishing, walking dogs, and hiking in the areas where the battery fragments and elevated lead concentrations were identified.

Research findings suggest that childhood, as well as prenatal (i.e., developing fetus), exposure to lead can adversely affect the health of young children, those six years of age and less, as well as the developing fetus, since both are considered more vulnerable to lead poisoning than adults. The reasons for a young child's increased vulnerability to lead poisoning are due to: 1) children's developing central nervous system; 2) hand-to-mouth behavior exhibited by children increases the ingestion rate for either lead contaminated soil, dust or paint chip; 3) children's efficiency of lead absorption from the gastrointestinal tract is greater than adults; and 4) iron and calcium

deficiencies that are prevalent in children may enhance the absorption and increase the toxic effects of lead. [ATSDR. Toxicological Profile for Lead. August 2007. <http://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=96&tid=22>].

Chronic exposure to low lead levels in children has been shown to cause effects on the central nervous system, which can result in deficits in intelligence, behavior, and school performance. Health effects from lead exposure in children and unborn fetuses include both physical and mental impairments, hearing difficulties, impaired neurological development, and reduced birth weights and gestational age. Some health effects from lead exposure, such as impaired academic performance and motor skills, may become irreversible and persist, even when blood lead concentration return to below 10 µg/dL. While there is some discrepancy in the scientific literature between the exact decreases in IQ points associated with a rise in BLL in children, the weight of scientific evidence supports the hypothesis that there is an inverse relationship. It has been hypothesized that the age of exposure, the younger being more susceptible to neurological disorders, is a factor. More research is needed to further delineate the effect of low level lead exposure, particularly on children. [CDC. Childhood Lead Poisoning Prevention Program <http://www.cdc.gov/nceh/lead/about/program.htm>]. Several studies have observed that low lead level exposure during the developmental stages can possibly produce lifelong changes, such as loss of intelligence in younger children, including:

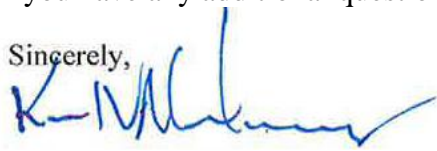
1. Jusko, et. al found children's intellectual functioning at 6 years of age is impaired by blood lead concentrations well below 10 µg/dL. [Jusko TA, et.al. Blood lead concentrations < 10 µg/dL and child intelligence at 6 years of age. *Environ Health Perspect.* Feb 2008; 116(2):243-8. <http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info:doi/10.1289/ehp.10424>].
2. A study by Canfield, R.L., et al concluded that IQ declined by 7.4 points as lifetime average BLL concentrations increased from 1 to 10 µg/dL. [Canfield, RL. Et al. Intellectual Impairment in Children with Blood Lead Concentrations below 10 µg per Deciliter. *New England Journal of Medicine.* 348:1517-1526. *April 17, 2003.* <http://www.nejm.org/doi/full/10.1056/NEJMoa022848>]
3. Lanphear, B.R. et al found environmental lead exposure in children who have blood lead levels < 7.5 µg/dL is associated with intellectual deficits. [Lanphear, Pet al. Low-Level Environmental Lead Exposure and Children's Intellectual Function: An International Pooled Analysis. *Environ Health Perspect* 113(7): 2005 <http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.7688>].

Although exposures to indoor dust at the site is not the primary exposure source on the site, residents that have young children should take precautions to avoid tracking in potentially contaminated soil into their home. **A blood lead test is the most useful screening and diagnostic test for evaluating a possible exposure to lead.** Therefore, as a prudent public health practice, blood lead tests are recommended for pregnant women, women trying to become pregnant, and children six years of age and younger. [CDC. Childhood Lead Poisoning Prevention Program <http://www.cdc.gov/nceh/lead/about/program.htm>]. PADOH and ATSDR suggest that parents monitor their children's behavior while they are playing outdoors to ensure

that their children (of any age) are not exhibiting pica behavior and eating excessive amounts of soil and discuss their concerns and/or observed behaviors with their health care provider.

Therefore, ATSDR concludes that lead levels in surface soils at this site are elevated, require additional delineation, and that actions to mitigate park visitors' exposures to lead should be implemented. As such, ATSDR concurs that further environmental characterization is needed at this site to better define the extent of contamination. ATSDR recommends that additional actions should be implemented at this site to mitigate exposures. Furthermore, ATSDR recommends that while the park remains open to visitors, information be posted for park users alerting them of the potential hazards of exposure to lead in battery fragments and soil lead contamination at the site.

If you have any additional questions, feel free to contact me.

Sincerely,


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